



**Agenda Item 4: Review of GREPECAS Programmes and Projects**

4.6 Projects under the AIM Programme (B0-DATM)

**CHALLENGES IN E-TOD IMPLEMENTATION IN THE SAM REGION**

(Presented by the Secretariat)

This working paper presents a series of challenges identified by the SAM Regional Office in the implementation of the provision of electronic terrain and obstacle data (e-TOD)

**References:**

- Annex 15 – *Aeronautical Information Services*
- ICAO Roadmap for the transition of AIS to AIM
- Report of the Fourth meeting of the CAR/SAM Programmes and Projects Review Committee (PPRC/4), Lima, Peru, 12-14 July 2016
- Report of the SAM/AIM/10 meeting
- Conclusions and recommendations of the e-TOD seminar for the SAM Region (Lima, Peru, 6-10 November 2018)

**ICAO strategic objectives**

*B – Air navigation capacity and efficiency*  
*E- Environmental protection*

**1. Introduction**

1.1 The roadmap for the transition of AIS to AIM defines the provision of terrain and obstacle data as a step that must be taken for the implementation of the AIM concept.

1.2 ICAO Annex 15 standards requiring States to provide terrain data for Area 1 (the entire State) and on obstacles exceeding 100 meters above the ground are effective since 12 November 2015. They also require the provision of terrain and obstacle data for other areas.

1.3 Likewise, Annex 15 establishes that the provision of terrain and obstacle data is a standard for other areas, also since 12 November 2015.

1.4 The PPRC/4 meeting reviewed e-TOD implementation.

**2 Discussion**

2.1 Chapter 10 of Annex 15, in its fifteenth edition, contains provisions on e-TOD air navigation applications. The provisions specify the areas for which it has to be provided, specifically in relation to international airports and those with runways in which Cat II or III precision approach operations have been established, and when operators require detailed terrain information in order to

assess the impact of terrain on decision height determination through the use of radio altimeters. (See **Appendix A**)

2.2 The PPRC/4 meeting analysed the status of implementation of e-TOD and noted a significant delay in its implementation. PPRC/4 informed States that, as of 12 November 2015, failure to provide such information would constitute an air navigation deficiency. Accordingly, States would be requested to provide the corresponding action plans in order to monitor the resolution of the deficiency.

2.3 The Secretariat requested the action plans through State Letter LT 15/2.3.2 – SA413 dated 26 August 2016, shown in **Appendix B**. Follow-up to these action plans was done through teleconferences and SAM/AIM meetings. These plans have horizons of 2020 and 2023, and, with the exception of Argentina, Brazil, and Chile, States have made very little progress in the activities proposed in the action plans.

2.4 The e-TOD seminar for the SAM Region formulated a series of recommendations following the presentations by experts, State delegates and industry representatives. These recommendations highlight the lack of capacity of States to develop terms of reference for the hiring of a company to provide e-TOD data, and technical capacity of AIS and other personnel that will be working with these data.

2.5 At the SAM/AIM meetings and the e-TOD seminar, note was taken that most States have a national mapping authority in charge of managing geodetic information.

2.6 On the other hand, consistent management of obstacle databases deployed within the territory of States can improve. This activity is carried out by entities beyond the scope of the aeronautical authority. In many cases, obstacle identification specifications differ from those required by ICAO. In general, only mobile or fixed obstacles built in the proximity of airports are submitted to civil aviation authorities for their authorisation and registration.

2.7 It should be noted that the acquisition of aeronautical information management packages should be accompanied by proper technical training to build the technical capacity within the State, thus gradually reducing technical reliance on the software provider.

### **3 Conclusion**

3.1 Some of e-TOD implementation challenges reported to the Regional Office are listed below:

- a) availability or competencies for the conduction of a cost-benefit assessment in case digital terrain and obstacle data are available;
- b) relevant State entities must be sensitised as to the usefulness of having digital terrain and obstacle data;
- c) development of competencies or provision of assistance for the development of the technical terms of reference for hiring companies to provide terrain and obstacle data;
- d) need to strengthen competencies in some States to work with terrain and obstacle data in a digital environment;

- e) need to strengthen the competencies for managing the obstacle database for the entire State; and
- f) better coordination and communication with the national mapping institution.

3.2 GREPECAS might consider establishing an *ad-hoc* group to study alternatives and strategies for the development of feasible solutions to e-TOD difficulties and challenges in the SAM Region, thus expediting implementation in the areas required by Annex 15. Likewise, this *ad-hoc* group should identify the risks and impact on other ASBU modules resulting from delays in e-TOD implementation.

3.3 **Appendix C** contains the draft terms of reference for this *ad-hoc* group.

#### **4 Suggested action**

4.1 The Meeting is invited to:

- a) take action on the information provided in this working paper;
- b) analyse the information presented in Appendices A, B, and C;
- c) study the proposal for the establishment of an *ad-hoc* group presented in paragraph 3.2; and
- d) agree on any other action it may deem appropriate.

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## APPENDIX A

### TERRAINS AND OBSTACLE ELECTRONICS DATA

1. Electronic terrain and obstacle data are intended to be used in the following air navigation applications:

- a) ground proximity warning system with forward looking terrain avoidance function and minimum safe altitude warning system;
- b) determination of contingency procedures for use in the event of an emergency during a missed approach or take-off;
- c) aircraft operating limitations analysis;
- d) instrument procedure design (including circling procedure);
- e) determination of en-route “drift-down” procedure and en-route emergency landing location;
- f) advanced surface movement guidance and control system; and
- g) aeronautical chart production and on-board databases.

The data may also be used in other applications such as flight simulator and synthetic vision systems, and may assist in determining the height restriction or removal of obstacles that pose a hazard to air navigation.

2. The coverage areas for sets of electronic terrain and obstacle data shall be specified as:

- Area 1: the entire territory of a State;
- Area 2: within the vicinity of an aerodrome, subdivided as follows:
- Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists;

Note.— See Annex 14, Volume I, Chapter 3, for dimensions for runway strip.

- Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side;
- Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and
- Area 2d: an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing terminal control area (TMA) boundary, whichever is nearest;
- Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centre line and 50 m from the edge of all other parts of the aerodrome movement area; and
- Area 4: The area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II or III.

Electronic terrain data shall be provided for Area 1. The obstacle data shall be provided for obstacles in Area 1 higher than 100 m above ground.

3. At aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.

4. At aerodromes regularly used by international civil aviation, electronic terrain data shall be provided for:

- a) Area 2a;
- b) the take-off flight path area; and
- c) an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.

5. At aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for:

- a) Area 2a for those obstacles that penetrate the relevant obstacle data collection surface specified in Annex 15, Appendix 8;
- b) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and
- c) penetrations of the aerodrome obstacle limitation surfaces.

Note.— Take-off flight path areas are specified in Annex 4, 3.8.2. Aerodrome obstacle limitation surfaces are specified in Annex 14, Volume 1, Chapter 4

6. At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data should be provided for Areas 2b, 2c and 2d for obstacles and terrain that penetrate the relevant terrain and obstacle data collection surface specified in Appendix 8, except that data need not be collected for obstacles less than a height of 3 m above ground in Area 2b and less than a height of 15 m above ground in Area 2c.

7. At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data should be provided for Area 3 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in Annex 15, Appendix 8, Figure A8-3.

8. At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 4 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8, for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters

*Note.— Area 4 terrain data and Area 2 obstacle data are normally sufficient to support the production of the Precision Approach Terrain Chart — ICAO. When more detailed obstacle data are required for Area 4, these may be provided in accordance with the Area 4 obstacle data requirements specified in Annex 15, Appendix 8, Table A8-2. Guidance material on accordance with the Area 4 obstacle data requirements specified in Appendix 8, Table A8-2. Guidance material on appropriate obstacles for this chart is given in the Aeronautical Chart Manual (Doc 8697).*

9. Where additional electronic obstacle or terrain data are collected to meet other aeronautical requirements, the obstacle and terrain data sets should be expanded to include these additional data.

10. Arrangements should be made for the coordination of providing Area 2 electronic terrain and obstacle data for adjacent aerodromes where their respective coverage areas overlap to assure that the data for the same obstacle or terrain are correct.

11. At those aerodromes located near territorial boundaries, arrangements should be made among States concerned to share Area 2 electronic terrain and obstacle data.

## APPENDIX B

## State Letter Ref.: LT 15/2.3.2 – SA413



International  
Civil Aviation  
Organization

Organisation  
de l'aviation civile  
internationale

Organización  
de Aviación Civil  
Internacional

Международная  
организация  
гражданской  
авиации

منظمة الطيران  
المدني الدولي

国际民用  
航空组织

Ref.: LT 15/2.3.2 – SA413

Lima, 26 August 2016

To: Mr. Philippe Guivarch, Regional Director of Civil Aviation, West Indies and French Guiana  
Lt. Col. Egbert Field, Guyana Civil Aviation Authority  
Mr. Andojo Rusland, Minister of Transport, Communication and Tourism, Suriname

Asunto: **Corrective Action Plan for the implementation of Electronic Terrain and Obstacle Data (e-TOD)**

**Aciton**

**Required: Your reply as soon as possible**

Sir/Madam,

I have the honour to refer to compliance of the Standard established in paragraphs 10.1.4, 10.1.5 and 10.1.6 of ICAO Annex 15 - *Aeronautical Information Services*, related to the provision of Electronic Terrain and Obstacle Data (e-TOD) at aerodromes regularly used by international civil aviation, which read:

“10.1.4 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.

10.1.5 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic terrain data shall be provided for:

- a) Area 2a;
- b) the take-off flight path area; and

- c) an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.

10.1.6 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for:

- a) Area 2a, for those obstacles that penetrate the relevant obstacle data collection surface specified in Appendix 8;
- b) objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and
- c) penetrations of the aerodrome obstacle limitation surfaces.

*Note.— Take-off flight path areas are specified in Annex 4, 3.8.2. Aerodrome obstacle limitation surfaces are specified in Annex 14, Volume 1, Chapter 4.”*

Considering the above, I will highly appreciate your informing on the actions being taken by your State for e-TOD implementation, detailing milestones and dates for each stage of the implementation.

I look forward to your prompt reply.

Accept, Sir, the assurances of my highest consideration.



Franklin Hoyer  
Regional Director  
ICAO South American Office  
Lima

cc: Mr. Claude Miquel, Deputy Director of Civil Aviation, West Indies and French Guiana  
Mr. Jerome Journet, Head of French ATM services, West Indies and French Guiana  
Mr. Jean-Michel Pubellier, Deputy Head ATM services, West Indies and French Guiana  
Mrs. Joyce Blokland-Wijnstein, Permanent Secretary, Ministry of Transport, Communication and Tourism, Suriname  
Mr. Faizel Baarn, acting Head of Civil Aviation Department, Suriname  
Mr. Brian De Souza, acting Director, CASAS, Suriname  
Mr. Marcus Doller, Air Safety Support Intl. (ASSI), United Kingdom  
Mr. Bruce D’Ancey, Policy Specialist, Flight Ops, Air Safety Support International (ASSI), United Kingdom

## APPENDIX C

### TERMS OF REFERENCE OF THE AD-HOC GROUP

Review the status of implementation of e-TOD for the SAM Region and propose a strategy for its completion.

#### 1. Terms of reference

- Define strategies for e-TOD implementation in the SAM Region, follow-up schedule, and progress reports.

#### 2. Work plan

In order to perform this task, the *ad-hoc* group shall:

- a) Review e-TOD implementation requirements (Annex 15, Chapter 10)
- b) Review Project G1 – Implementation of e-TOD in the SAM Region.
- c) Review the status of implementation of action plans submitted by States.
- d) Propose, if necessary, a regional e-TOD implementation technical assistance project, if deemed appropriate.
- e) Review the impact of e-TOD implementation delays on air navigation.
- f) Propose e-TOD implementation strategies for the coming triennium.
- g) Designate a rapporteur to submit changes and proposals to the plenary sessions

#### 3. Work modality

- a) The *ad-hoc* group will meet during the GREPECAS plenary.
- b) Members will be elected by State delegates
- c) The AIM/MET RO will act as Secretary of the Group
- d) The Group will define the sessions required for completing the strategy proposal to be submitted to the consideration of GREPECAS.